



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

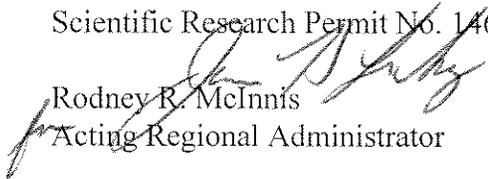
NATIONAL MARINE FISHERIES SERVICE

Southwest Region

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APR 6 2004

MEMORANDUM FOR: Scientific Research Permit No. 1467, SWR-03-9063:RBD

FROM: 
Rodney R. McInnis
Acting Regional Administrator

SUBJECT: Addendum to the Central Valley Programmatic Biological Opinion
for Scientific Research

I. CONSULTATION HISTORY

Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, (ESA) provides the National Marine Fisheries Service (NOAA Fisheries) with authority to grant exceptions to the ESA's "taking" prohibitions for scientific research (see regulations at 50 CFR 222.301 through 222.308, and 50 CFR 224.101 through 224.102). Scientific research or enhancement permits may be issued to Federal or non-Federal entities conducting research or enhancement activities that involve take of ESA-listed endangered or threatened species. Any permitted research or enhancement activities must: (1) be applied for in good faith, (2) if granted and exercised, not operate to the disadvantage of the endangered species, and (3) be consistent with the purposes and policy set forth in section 2 of the ESA (50 CFR 222.303(f)). NOAA Fisheries prepared this addendum to the Central Valley Programmatic Biological Opinion for Scientific Research (Central Valley Research Opinion; NOAA Fisheries 2003a), signed on September 5, 2003, in compliance with section 7(a)(2) of the ESA, as amended (16 U.S.C. 1536).

On December 11, 2003, Dr. Peter Klimley of the University of California at Davis submitted an application for a research permit for a project involving capture of non-listed green sturgeon (*Acipenser medirostris*) and opportunistic evaluation of salmonid capture rates using two different nets in San Pablo, Suisun, and Grizzly Bays, and the Sacramento River. The proposed project may result in take of adult ESA-listed endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), and threatened Central Valley steelhead (*O. mykiss*). NOAA Fisheries published a notice of receipt of Dr. Klimley's permit application in the Federal Register on January 15, 2004 (69 FR 2332), announcing the beginning of a thirty-day public comment period. No public comments were received.



II. DESCRIPTION OF THE PROPOSED ACTION

Under the authority of section 10(a)(1)(A) of the ESA, NOAA Fisheries proposes to issue Scientific Research Permit No. 1467 (Permit 1467) to Dr. Klimley authorizing take of adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. The permit would be in effect through June 30, 2008, and would be subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit unless it is modified, suspended, or revoked sooner.

A. Research Project Description

In a request for Permit 1467, Dr. Klimley proposes to study the general biology of green sturgeon in the Sacramento-San Joaquin watershed. The study will involve collecting adult green sturgeon primarily from San Pablo, Suisun, and Grizzly Bays (San Francisco Estuary), and opportunistically within five miles of the Red Bluff Diversion Dam in the Sacramento River (River Miles 241 to 251; hereafter referred to as the "Red Bluff site") to study the: (1) movements and distribution, (2) physiology, (3) reproductive biology, and (4) genetics of adult green sturgeon. Sampling at the Red Bluff site will depend on confirmation of the presence of green sturgeon from California Department of Fish and Game (DFG) biologist, Curtis Brown. Although the project exclusively targets collection of migrating subadult and adult green sturgeon, the investigators also will evaluate the incidental capture rate and bycatch survival rate of salmonids captured with two different nets.

Adult sturgeon will be collected during their migration with two monofilament gill nets during the months of April, May, August, September, and October in 2004 and 2005, and possibly for one to three additional years, depending on funding. The first net will be 183 x 7.6 m wide, with 24 cm stretch mesh webbing ("large mesh net"). The second net will be 192 x 6 m wide, with mesh width measuring 18.4 cm ("fine mesh net"). The nets will be soaked for 60 minutes, 4 times per sampling day (*i.e.*, 30 days from April-May; 45 days from August-September). Should early sampling efforts yield a high bycatch of salmonids (*e.g.*, > 10 individuals), only the large mesh net will be deployed for the remainder of the study.

Salmonids caught in nets will be removed, measured, and then placed in a recovery box. The fish will be allowed to recover until they exhibit active swimming movements (*e.g.*, tail oscillations) and regular movement of their opercula to draw water, and then released. The mesh surrounding entangled individuals will be severed to minimize trauma to fish during removal. The recovery box will be mounted on the side or aft deck of the research boat, and will be supplied with flow-through, oxygenated water. When sampling in the Sacramento River, investigators will set nets within deep pools inhabited by green sturgeon and actively avoid capturing Chinook salmon spawning in riffles. For each salmonid captured, the following data will be collected: location of capture, sex, fork length, gill net mesh size, condition at capture and release.

B. Description of the Action Area

The action area includes sampling areas within the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead Evolutionarily Significant Units (ESUs). As mentioned above, sampling will occur in the San Francisco Estuary (in San Pablo Bay, Suisun Bay, and Grizzly Bay), and at the Red Bluff site between Sacramento River Miles 241 and 251 near the town of Red Bluff.

C. Requested Amount of Take

The applicant estimates a potential lethal take of one-third of all salmonids captured in the nets, including those that will die following release. The project may therefore result in nonlethal take of 4 and lethal take of 2 adult Sacramento River winter-run Chinook salmon, nonlethal take of 10 and lethal take of 5 adult Central Valley spring-run Chinook salmon, and nonlethal take of 2 and lethal take of 1 adult Central Valley steelhead, annually. Take estimates are based on studies using similar sampling methods (see permit application and section V, *Effects of the Proposed Action* of this memorandum).

D. Measures to Reduce the Impacts of Issuing Permit 1467

Following are measures implemented to minimize any adverse impacts on these salmonids during the research activities:

- a. NOAA Fisheries has reviewed the credentials of the principal investigators for the proposed research: All investigators are well qualified and have provided evidence of experience working with salmonids.
- b. NOAA Fisheries has developed nondiscretionary conditions for Permit 1467 that are necessary and appropriate to minimize take of ESA-listed salmonids, as described in the permit and Appendix B of the Central Valley Research Opinion. The investigators will ensure that all persons operating under Permit 1467 will be familiar with the terms and conditions therein.
- c. NOAA Fisheries will monitor project activities to ensure that the project is operating satisfactorily in accordance with Permit 1467. NOAA Fisheries will monitor actual annual take of ESA-listed fish species associated with the proposed research activities (as provided in annual reports or by other means) and will adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of the salmonids.
- d. All persons operating under Permit 1467 will be properly trained and have access to properly maintained state-of-the-art equipment.

- e. All salmonids caught in gill nets will be immediately removed from the net before any other fish are processed. The salmonids will be allowed to recover in an oxygenated recovery box until they exhibit active swimming movements (*e.g.*, tail oscillations) and regular movement of their opercula to draw water before they are released.
- f. Should the bycatch rate of salmonids reach 10 individuals, the applicant will strictly deploy only the large mesh net, which is expected to reduce encounter rate for all fish and capture efficiency especially for steelhead.
- g. The researchers will actively avoid capturing Chinook salmon when fishing within the Sacramento River by avoiding sampling near riffles and instead sampling within deep pools that are expected to be inhabited by green sturgeon.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

The issuance of Permit 1467 may potentially affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. The Central Valley Research Opinion describes the status of these ESUs. The current status of listed salmonids in the Central Valley, based on their risk of extinction, has not significantly improved since the species were listed (NOAA Fisheries 2003b). Although the number of Sacramento River winter-run Chinook salmon has increased in the last six years, the ESU remains at risk of extinction. Sacramento River winter-run Chinook salmon run size declined from a high of approximately 118,000 fish in 1969 to a low of fewer than 200 fish in 1994, and has recently increased to over 8,000 fish in 2003 (DFG, unpublished data). Central Valley spring-run Chinook salmon have displayed broad fluctuations in abundance over time. Their numbers have ranged from lows of approximately 400 in 1966 and 3,000 in 1992 to highs of approximately 38,000 in 1982 and 34,000 in 1998, and recently number nearly 17,000 in 2003 (DFG, unpublished data). Central Valley steelhead declined from an average of approximately 11,000 adult fish in the late 1960s and 1970s, to approximately 2,000 fish through the early 1990s (McEwan 2001). Recent estimates from trawling data in the San Francisco-San Joaquin Delta indicate that over 3,600 female steelhead spawn in the Central Valley basin (NOAA Fisheries 2003b).

As discussed in the Central Valley Research Opinion, factors affecting the species and their habitats include: (1) dam construction that blocks previously accessible habitat; (2) water development activities that affect water quantity, water quality, and hydrographs; (3) land use activities such as agriculture, flood control, urban development, mining, and logging; (4) hatchery operation and practices; (5) harvest activities; (6) ecosystem restoration actions; (7) natural conditions; and (8) scientific research. Large dams are present on almost every major tributary to the Sacramento and San Joaquin Rivers, and block salmon and steelhead access to

the upper portions of watersheds that represent approximately 80 percent of historical habitat. Water diversions directly entrain fish, and can affect habitat by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban, and other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed ESUs, increased population sizes, and consequently increased likelihood of survival and recovery.

The research activities described in this document do not result in any changes or effects to salmonid habitat including critical habitat for Sacramento River winter-run Chinook salmon. Therefore, critical habitat is not likely to be affected by issuance of Permit 1467 and is not considered further in this document.

IV. ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR §402.02). A detailed discussion of the factors affecting the species in each ESU is provided in the Central Valley Research Opinion.

A. Status of the Species in the Action Area

The action area provides migratory habitat for listed salmonids in the Central Valley. Adult Sacramento River winter-run Chinook salmon typically migrate through the action area from November through July to their spawning grounds in the upper Sacramento River (U.S. Fish and Wildlife Service [FWS] 1995, NOAA Fisheries 1997), whereas adult Central Valley spring-run Chinook salmon pass through the action area as they return to spawn in their natal tributaries in the Sacramento basin between February and September (FWS 1995, Ward and McReynolds 2001). Adult Central Valley steelhead migrate past the Sacramento River and Feather River confluence throughout much of the year (*i.e.*, between July and March; McEwan 2001), which likely corresponds to the timing of their migration through the action area.

Juvenile Sacramento River winter-run Chinook salmon pass through the action area during their emigration to the ocean from December through April (FWS 1995). Juvenile spring-run Chinook salmon pass through the action area from October through May (Ward and McReynolds 2001, FWS 1995). Because it is often difficult to distinguish resident rainbow trout from steelhead during their juvenile life stage, the majority of data are available for the species, *O. mykiss*. Juvenile *O. mykiss* pass through the action area from January through May (McEwan 2001).

B. Factors Affecting the Species in the Action Area

The Central Valley Research Opinion describes the ongoing activities and historical events that have affected listed salmonids in the Central Valley. In particular, water diversion operations, fish passage through water quality control gates, dredging and mining operations, and hatchery operations are among the activities that have the largest potential impacts to the populations of listed salmonids in the action area. For example, the Central Valley and State Water pumps alter historical flow volume and patterns that affect the timing of juvenile outmigration and direction of adult upstream migration of salmonids. The Suisun Marsh Salinity Control Gates affect the timing and behavior of fish passing through Suisun Marsh, as well as increase the likelihood of fish predation on migrating salmonids. Dredging and sand mining projects affect habitat quality by degrading water quality, destroying vegetative cover, and temporarily disturbing fish. Finally, the large numbers of salmonid fish released from hatcheries (such as the Feather River and Mokelumne River hatcheries) can pose a threat to wild salmonids through genetic impacts such as inbreeding, and the increased competition, predation, and fishing pressure that may result from hatchery production.

V. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify effects on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with NOAA Fisheries' issuance of Permit 1467. The potential effects of the proposed research activities on listed salmonids would result from bycatch of adult salmonids while fishing for sturgeon.

The timing of the proposed research activities in April and May would coincide with upstream migration of adult Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon through the San Francisco Estuary and Red Bluff site. Additionally, research activities in August, September, and October likely would coincide with Central Valley steelhead migration and a small proportion of Central Valley spring-run Chinook salmon migration.

Approximately 12 and 9 percent, respectively, of adult winter-run Chinook salmon pass through the San Francisco Estuary in April and May (FWS 1995). Similarly, approximately 12 and 20 percent, respectively, of adult spring-run Chinook salmon are likely to be present during the

months of April and May (FWS 1995). A smaller proportion (*i.e.*, five percent) of adult spring-run Chinook salmon would be present in the San Francisco Estuary in the month of August (FWS 1995). Very little is known about the distribution and abundance of adult steelhead in the San Francisco Estuary. However, adult steelhead have been salvaged during the months of April and May, but not in August through October, at the Central Valley Project and State Water Project pumping facilities located just upstream of the Estuary in the southern Sacramento-San Joaquin Delta (DFG, unpublished data).

At the Red Bluff site, 3 to 14 percent of adult winter-run Chinook salmon and 5 to 17 percent of adult spring-run Chinook salmon are expected to be present in the months of April and May. Also, 5 to 30 percent of adult steelhead are expected to be present near the Red Bluff site from August through October (FWS 1995), and a few individuals (*i.e.*, < 20) have been found in April and May in the Sacramento River upstream of the Feather River confluence (McEwan 2001).

The applicant's estimate of adult salmonid bycatch is based on studies using similar sampling methods (*e.g.*, studies conducted by the Washington Department of Fish and Wildlife and DFG; see permit application). Should the bycatch rate of salmonids reach 10 individuals, the applicant will strictly deploy only the large mesh net, which should lower the incidental encounter rate (see below) for all fish, and reduce capture efficiency especially for steelhead, which should be more vulnerable to capture by the small mesh net (Beamesderfer and Parker 2001).

Two factors determine bycatch mortality: the incidental encounter rate and the mortality rate of those fish that are incidentally encountered (Buchanan *et al.* 2002). The incidental encounter rate is a product of the number of fish migrating through the sampling area, sampling effort, and percent of habitat sampled. Assuming the researchers can deliberately avoid bycatch of salmonids while sampling at the Red Bluff site (*i.e.*, given the differential holding and spawning areas of sturgeon and salmonids), bycatch of salmonids primarily should occur in the San Francisco Estuary, through which every migrating adult salmonid would pass en route to their spawning grounds. In the sampling period of April and May, a total of 21 percent of adult winter-run Chinook salmon (*i.e.*, 1,726 fish) and 32 percent of adult spring-run Chinook salmon (*i.e.*, 5,620 fish) pass through the San Francisco Estuary (based on DFG unpublished data, and adult migration timing through the Sacramento-San Joaquin Delta located upstream of the Estuary, from FWS 1995). Approximately 5 percent (*i.e.*, 878 fish) of adult spring-run Chinook salmon pass through during August. In April and May, given the proposed sampling protocol (*e.g.*, 120 hours net soak time over the 1464 hours in the period), sampling would occur 8 percent of the time. According to the applicant, the nets would be positioned to block approximately four percent of the San Francisco Estuary. Therefore, the annual incidental encounter rate would total approximately 0.07 percent of the winter-run Chinook salmon adults (*i.e.*, 5 fish) and 0.1 percent of spring-run Chinook salmon adults (*i.e.*, 18 fish).

Given the paucity of information regarding steelhead population abundance and distribution, it is difficult to estimate the steelhead incidental encounter rate. However, we can expect a smaller steelhead bycatch compared to bycatch of the larger-bodied Chinook salmon due to the large

mesh sizes proposed for use in this study (*i.e.*, 18.4 cm and 24 cm mesh). Beamesderfer and Parker (2001) describe numerous cases where larger mesh gill nets (*e.g.*, 22.8 cm mesh) resulted in a smaller steelhead bycatch. As a point of comparison, the DFG conducted a similar study to sample sturgeon in the San Francisco Estuary from August through October. Using a trammel net of multiple mesh sizes ranging from 15.2 to 20.3 cm to sample a greater proportion of the Estuary than proposed for the present study, only four adult steelhead were caught as bycatch in 2001 and zero steelhead were caught in 2002. We therefore can expect fewer steelhead to be captured from this study because sampling will occur half as frequently and over two-thirds of the area compared to the DFG study. Assuming a 50:50 ratio of males to females in the steelhead population, and an estimated 3,628 females (NOAA Fisheries 2003b), we can assume the current steelhead population to number 7,256 adults. Based on the DFG study that encountered four adult fish in 2001, we can therefore estimate an incidental steelhead encounter rate of 0.03 percent, which would equal 2 adults of 7,256 adults.

The survival rates of salmonids captured in gill nets are highly influenced by net soak time, careful handling of fish, and the use of well-designed recovery boxes. Bycatch mortality rates are correlated with net soak times. For example, short net soak times (*e.g.*, 40 minutes) result in substantially lower mortality rates (*e.g.*, 7 percent) compared to long soak times (*e.g.*, 140 minutes and 60 percent mortality; Buchanan *et al.* 2002). Buchanan *et al.* (2002) estimate that a net soak time of 60 minutes, which the applicant proposes, would yield an approximate 13 percent mortality rate.

Immediate survival of adult spring-run Chinook salmon caught in 20.3 cm monofilament gill net is high (*i.e.*, 98 percent); however, post-release survival of the fish is much lower, with only 50 percent recovery rate of fish released from gill nets compared to control groups (Vander Haegen *et al.* 2002). The use of recovery boxes to help fish recover from exhaustion and stress resulting from capture in gill nets has been shown to be successful in minimizing post-capture mortality rates. The recovery rates of salmonids captured and released in the method proposed by the applicant are relatively high. For example, post-capture delayed mortality (*i.e.*, after 24 hours) of coho salmon was only 2.3 percent after a net soak time of ≤ 70 minutes, careful fish handling, and fish revival for up to 2 hours in a recovery box on board a commercial gill net vessel (Farrell *et al.* 2001).

Given the combination of a relatively short net soak time, careful handling of fish, use of a recovery box, and more importantly, the very low rate of incidental encounter of salmonids in the proposed study, NOAA Fisheries expects that the number of adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead harmed or killed by project activities will be small relative to the sizes of the respective ESUs. Considering the worst case scenario that would result in 100 percent mortality of all salmonid bycatch, this would translate into 0.07 percent fewer adult winter-run Chinook salmon, 0.1 percent fewer adult spring-run Chinook salmon, and 0.03 percent fewer adult steelhead in the population. Furthermore, information resulting from this study on the incidental capture rate and bycatch survival rate of salmonids will contribute to our knowledge of gill net effects on local

salmonid ESUs. For these reasons, NOAA Fisheries believes issuance of Permit 1467 to authorize the proposed research project is not likely to appreciably reduce the likelihood of survival and recovery of the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs.

VI. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR § 402.02 as “those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.” Future Federal actions, including the ongoing operation of hatcheries, water diversions, and some land management activities, will be reviewed through separate section 7 consultation processes and not considered here. Similarly, non-Federal actions that require authorization under section 10 will be evaluated in separate section 7 consultations and not considered here. A general summary of potential cumulative effects that may affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead within the action area is described in the Central Valley Research Opinion. These include ongoing agricultural and urban activities that likely will continue to affect stormwater runoff patterns and water quality in the action area, and future population growth that will result in new urban development and increased disturbance of waterways and riparian areas, as well as stormwater and water quality impacts.

VII. CONCLUSION

After reviewing the best available scientific and commercial data, the current status of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, the environmental baseline for the action area, the effects of the proposed issuance of Permit 1467, and the cumulative effects, it is NOAA Fisheries’ biological opinion that the issuance of Permit 1467, as proposed, is not likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs. Critical habitat for Sacramento River winter-run Chinook salmon occurs in the action area, but no destruction or adverse modification of that critical habitat is anticipated.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential

behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The issuance of Permit 1467 authorizes intentional take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with the proposed research activities. The action of issuing Permit 1467 does not anticipate incidental take of endangered or threatened species. This opinion does not authorize any taking of a listed species under section 10(a) or immunize any actions from the prohibitions of section 9(a) of the ESA.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the issuance of Permit 1467. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this amendment to the Central Valley Research Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

X. LITERATURE CITED

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